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CASEBOOK

OF

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BIG BANG SKY JUICE

How Robert Dicke slipped you a mickey

The observation reported in 1965 that the predicted 3° K Big Bang relic blackbody radiation indeed fills the sky was a rookie error by Penzias and Wilson. Princeton's Dicke palmed it off as a Big Bang discovery. It was awarded the Nobel Prize in 1978.
Sip for sip, this sky juice is more expensive than 18-year old Yamazaki.
They're sippin' it, and you're payin' for it!

PREFACE

The accidental discovery of the theorized cosmic blackbody radiation on the sky at a temperature of ~ 3.5 K by Arno Penzias and Robert Wilson in 1964-1965 clinched Big Bang Cosmology good and proper. Even Big Bang's staunchest opposers such as Hannes Alfvén and Fred Hoyle were stumped. They then tried to find alternative explanations of this black body radiation (whose discovery they accepted on implicit trust.). The world accepted the discovery as confirmation of Big Bang, and its triumphal march as clinched, textbook science began. Today this is the official science.

The first time I came upon this discovery in any detail was in 1968 when I came to study Radio Astronomy at the University of Michigan in Ann Arbor. My advisor Fred Haddock – a Radio Astronomy pioneer – told me about this as an inspirational story. In time I drifted to other fields and had no occasion to think about this.

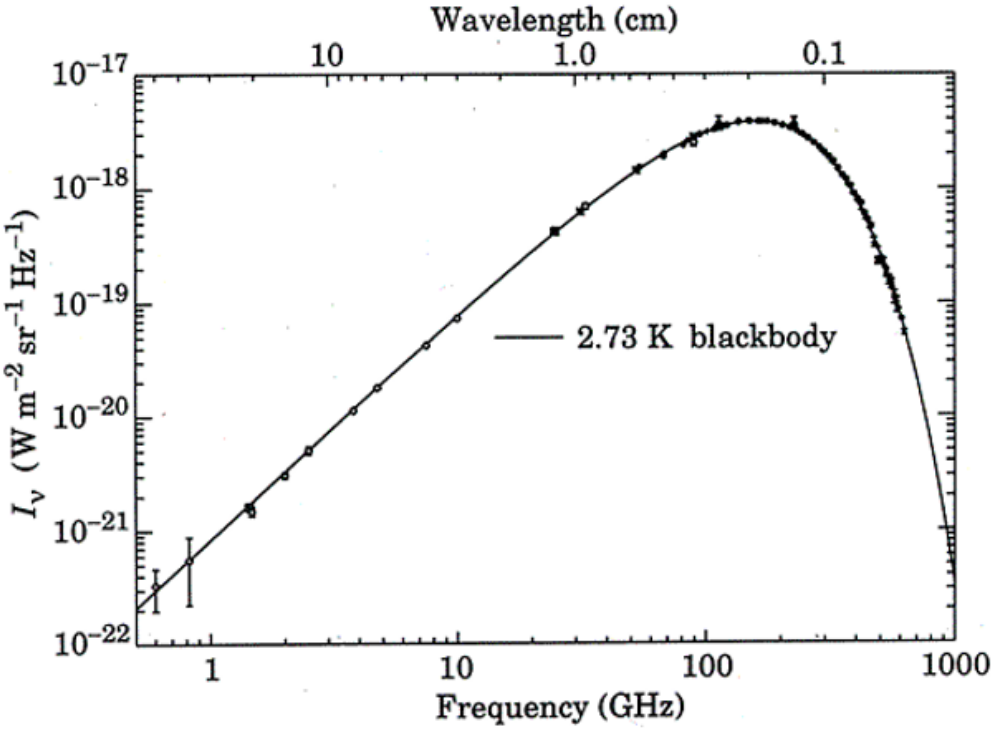
Around about 2007 as I came to examine the discovery of the full spectrum of this black body by COBE satellite, I found that it was a complete fraud. This is when I went back and read the two-page Penzias-Wilson discovery paper for the first time. In a matter of minutes it became clear to me that there was no discovery here.

I say this not to brag, but to express my extreme puzzlement why, for decades on end, the entire scientific establishment accepted this discovery, anointed this with the Nobel Prize, and built a billion-dollar discovery industry based on this – an industry that is currently thriving in spite of my exposition. In 2018 the Planck Satellite Collaboration issued a resounding reaffirmation of the Penzias-Wilson discovery.

I have included my findings on the Penzias-Wilson discovery in my 2015 book *The Falsifiers of the Universe*, as also sporadically in my blog site *The Dreamheron Chronicles*. In this free eBook I offer a readily available account in one place, composed of material from these two sources. The chapter and section headings refer to the book.

01/02/2019

A QUESTION OF PHYSICS GUT



All other considerations aside, how can a blackbody radiation field whose intensity peaks near 160 GHz be detected beyond doubt by a single-frequency observation at 4 GHz where the intensity is down by more than two orders of magnitude from the peak and the spectrum is changing steeply?

How does this sit with your gut?

CHAPTER II-1

Penzias and Wilson

Arno Penzias immigrated to the United States from Germany when he was just a little boy, and his family settled in New York. He proceeded to receive his Ph. D. and then to join the AT&T Bell Laboratories in Holmdel, New Jersey. Here he met Robert Wilson, a born and bred Texan. They became collaborators in experiments having to do with antennas and microwave. Their company had some leftover equipment from a previous project in long distance communication, and the two researchers obtained permission to do some radio astronomical experiments with the equipment. The year was 1964.

Whatever Penzias and Wilson were thinking, cosmology was not on their minds. They did not even know about blackbody relic radiation in the sky proposed within Big Bang cosmology.

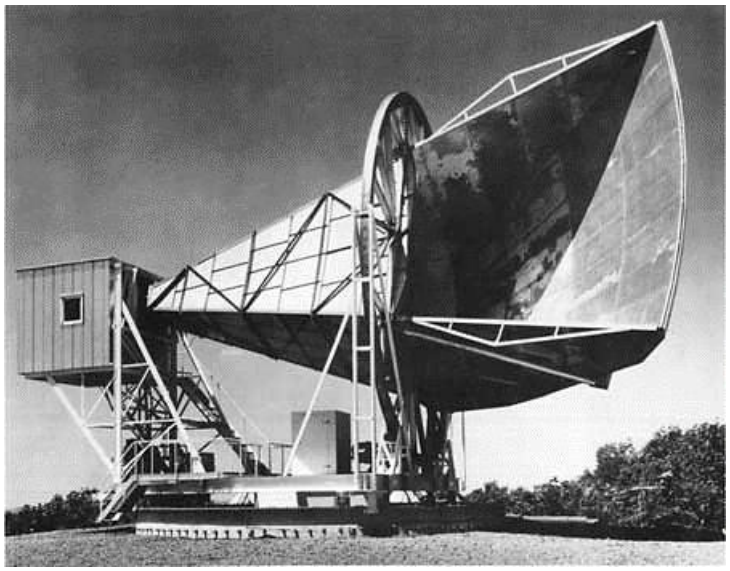
The antenna used by these researchers was a horn-like antenna, also called a sugarscoop antenna because of its shape (Figure II-1). It was a steerable antenna that could be pointed to various parts of the sky, down nearly to the horizon and even groundward. They operated their antenna near 4080 MHz, or a wavelength of about 7.35 cm. Their first task was to determine the antenna noise temperature, a parameter needed to establish the noise threshold of their system.

To their great bafflement, Penzias and Wilson measured an antenna temperature of ~ 6.7 K, well in excess of the expected ~ 3.2 K. This latter number was determined by taking into account all known sources of noise in the environment. They were now left with an unexplained excess antenna noise temperature

$\Delta T_A \approx 3.5 \pm 1$ K.

They tried to troubleshoot this and pinpoint the source of this excess temperature. They did not succeed. The source of this temperature – indicative of an excess microwave power at 4080 MHz incident on the antenna – remained a mystery.

Further studies with the antenna showed that this excess power was omnipresent and always present; and isotropic and non-polarized. These tests would have been done by pointing the antenna in various directions at various times of the day and the year, and by rotating the polarization plane of the antenna. An auxiliary antenna also might have been used.



nps.gov

Figure II-1:

The Penzias-Wilson antenna in Holmdel, New Jersey.

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Around 1960 Princeton physics professor Robert Dicke acquired a graduate student named James Peebles – a Canadian who had immigrated to America. This would be the beginning of a beautiful relationship – especially as it concerned establishing Big Bang cosmology as the official history of the origin of the Universe.

Robert Dicke had distinguished himself as an engineering physicist, especially during his tenure at the famous MIT Radiation Laboratory, dedicated then to defense research. His name became famous in connection with the Dicke Radiometer – a type of microwave receiver. Dicke's work at the Laboratory had already caused him to think about measuring the predicted cosmic relic blackbody radiation, and so he was well situated to contribute to Big Bang cosmology – more so now that he had a very able graduate student in Peebles.

Dicke had in fact done an experiment from a rooftop of the MIT RadLab, and was able to establish that any relic radiation temperature T_{BB} would be no greater than ~ 20 K.

The teacher and the student now started in right earnest on nurturing and furthering the science of Big Bang cosmology. On a hot summer day in 1964, while discussing the possibility of there being present this relic blackbody radiation in the sky, Dicke told Peebles: "Why don't you go and think about the theory." And that set the lifelong scientific pursuit for Peebles. He was the theoretician, and looked after that side of the research. Dicke set out to try to observe the relic radiation.

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When Robert Dicke heard about the mysterious noise observed by Penzias and Wilson, he instantly connected this to the relic radiation that he himself was looking for – and was probably on his way to success. He might well have become crestfallen at being thus "scooped". But it seems that Dicke's devotion to his scientific pursuit was greater than his personal ambition. He saw in this development great opportunities for the cause. He and his group arranged a meeting at Princeton with Penzias and Wilson.

Arno Penzias, Robert Wilson, James Peebles, and Robert Dicke

We do not know what was discussed at that meeting between the Bell Labs group and the Princeton group, but we do know what followed. Two back-to-back papers in the same issue (July 1965) of *Astrophysical Journal* were published by the two groups. In effect, the first one – by the Princeton group – prepared the psychological ground for accepting the 3.5 K observation as the telltale Big Bang blackbody. The second paper – by the Bell Labs group – then detailed the observation. The two papers thus jointly pitched the discovery:

$T_{BB} \approx \Delta T_A \approx 3.5$ K.

This was the beginning of the era of Big Bang cosmology as hardcore science. After all, its very specific prediction of a relic blackbody in the sky that had developed over a long period of time had at last been confirmed in a spectacular way, and with a serendipitous discovery no less. Things snowballed from there. There was no stopping now, no looking back. And too bad for the dissidents! They did not have a leg to stand on anymore. For who can argue with such success?

The handy way of referring to the relic radiation today as "3 degree K blackbody" probably has its roots in this discovery. This number gave the Big Bang theoreticians for the first time a firm anchor point from which to venture out as far and as wide as they fancied. Whatever the significance of the discovery was perceived to be to Big Bang cosmology in 1964, it would only grow from there.

Outside of Big Bang cosmology and to science in general, however, the discovery – interesting though it was – was not of any great impact. A radio hiss, some television hash – these are the things it explained.

Most curiously, the plainly evident fact did not seem to bother anyone in the scientific community that a single frequency measurement near 4 GHz was being interpreted to confirm an entire blackbody spectrum that peaks out near 200 GHz, and is skewed to boot.

III-2.5 Antenna Noise Temperature

The Antenna Temperature (variously called Antenna Noise Temperature and Noise Temperature) referred to the antenna terminal (before any amplifiers) is a thing engineers have defined for their convenience. It is not a real temperature of anything real. It is a measure of the irreducible "thermal" noise power at the antenna terminal that arises by virtue of the antenna being placed in a thermal bath – usually the heat from ground below and the sky above, and man-made heat all around. It is an equipment-specific number. The Antenna Temperature also depends on the ohmic losses in the antenna, but in our discussion we will assume that the antenna is lossless.

This noise power P_{noise} (resulting from all frequencies being received) that appears at the antenna terminal can be calibrated against a standard source of noise. Then we write $P_{noise} = kT_A$ to convert the power to the Antenna Temperature T_A (k = the Boltzmann constant). That is basically all there is to it.

Referring to Figure III-10, we will now examine the relationship of the Antenna Noise Temperature to the actual temperature field $T(\theta, \varphi)$ existing there. So, for an antenna pointing directly to the zenith, $T(\theta, \varphi)$ towards the front of the antenna would be the temperature of the sky. Towards the back of the antenna it would be the temperature of the ground.

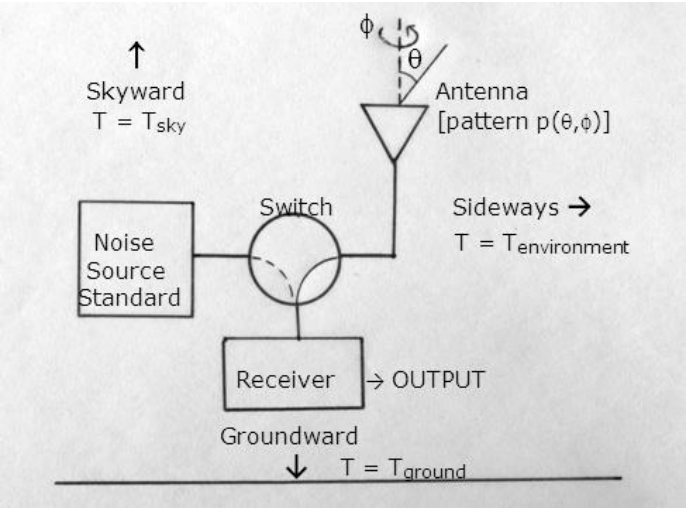


Figure III-10: Arrangement for measuring Antenna Noise Temperature.

By definition and by the looking at actual physical process, the Antenna Temperature is the average temperature seen by the antenna, modified by the polarization of the antenna:

$$T_A = C \int_0^{2\pi} \int_0^{\pi} T(\theta, \varphi)\, p(\theta, \varphi)\, d\Omega \Big/ \int_0^{2\pi} \int_0^{\pi} p(\theta, \varphi)\, d\Omega \qquad \text{(III-8)}$$

where $d\Omega = \sin\theta \; d\theta \, d\varphi$.

Thus the polarization factor C is of crucial importance if we want to connect a measured T_A to the actual temperature T.

If the antenna is linearly polarized and the incoming radiation is unpolarized (or randomly polarized), then C = ½.

If the antenna is linearly polarized and incoming radiation is linearly polarized and aligned with the antenna polarization, then C = 1.

If the above two linear polarizations are orthogonal, then C = 0.

If the incoming radiation is unpolarized and the antenna receives radiation in two orthogonal polarizations and adds these powers to obtain the total power incident, then C = 1.

If the environment temperature is the same all around the antenna, then we can take T out of the integral sign, leaving us

$$T_A = CT \qquad \text{(III-9)}$$

Just to be clear, this is the Antenna Noise Temperature of an antenna totally immersed in a thermal bath of temperature T extending to infinity in all directions. If the antenna is linearly polarized and that radiation is unpolarized (as thermal radiation is), then C = ½ and

$$T_A = T/2 \qquad \text{(III-10)}$$

To measure the Antenna Noise Temperature, the noise power output from a standard noise source is adjusted to give the same receiver output as the noise power from the antenna. When this happens, the noise temperature of the source is the Noise Temperature of the antenna. It is clear that:

(1) The Antenna Temperature T_A and environment temperature T cannot be related without the knowledge of the factor C.

(2) The factor C is known only if the polarization state of the incoming radiation is known. To know the polarization state of unknown radiation, one needs a linearly polarized antenna whose plane of polarization can be continuously rotated at least 90 degrees.

(3) An unknown radiation field cannot be determined to be a thermal radiation field without detailed and laborious measurement of the absolute intensity at multiple frequencies. To measure the isotropy of this radiation, one needs an antenna capable of pointing to a wide range of angles.

We note in passing that in the large majority of authoritative textbook expositions of Antenna Temperature, the factor C is omitted without any mention or discussion. This is because in almost all such applications the antenna and the radiation are linearly polarized and matched to each other. But this accepted and understood omission may easily lead an amateur user of the expression astray.

CHAPTER III-3

Derived antennas

III-3.1 Holmdel Horn

The antenna used in the Penzias & Wilson discovery (Figure II-1) is sometimes referred to as a horn antenna and has in fact the moniker Holmdel Horn. In actuality, it is very much a parabolic reflector antenna. It is actually a segment of a parabolic reflector as shown in Figure III-11.

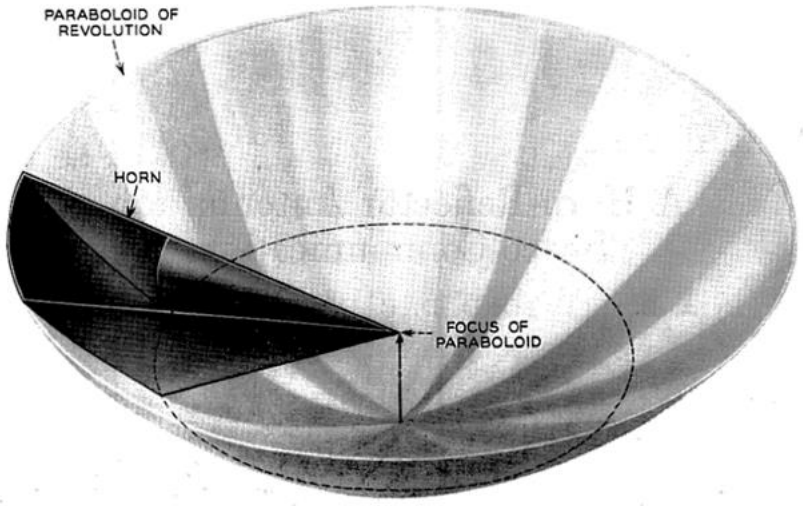


Figure III-11: The Penzias & Wilson antenna – although referred to as a horn – is actually a part of a parabolic reflector surface.

The radiation collected by this surface segment is directed to a feed horn located at the focus of the original parabola.

The feed horn is usually a linearly polarized antenna. This polarization is also the polarization of the overall antenna-feed system. If the feed horn can be rotated about its axis, then the plane of polarization of the antenna can be changed.

If the incoming radiation were unpolarized, this antenna would receive only half the power. In order to receive the full incoming power, the radiation would have to be received in two orthogonal polarizations, and these powers would have to be combined in some way.

CHAPTER IV-1

The Penzias-Wilson experiment

IV-1.1 Language of power

To any seasoned Antenna & Microwave specialist, the discovery of Arno Penzias and Robert Wilson would appear most baffling at first sight. How can a single frequency measurement at 4 GHz discover an entire spectrum which peaks out sharply near 200 GHz – and is skewed to boot?

But let us go through the entire science of this discovery.

What did Penzias and Wilson *actually* observe? They pointed their antenna (Section II-1) to the sky and found a microwave noise power P_{obs} at ~ 4 GHz that was higher than expected. We will somewhat loosely use the concept of power addition and subtraction, for this is adequate for our purpose. Referred to the input of the receiver/preamplifier of their measuring set-up, they observed this excess spectral power:

$$\Delta P = P_{obs} - P_{expected} \qquad \text{(IV-1)}$$

They also determined experimentally that this mystery excess radiation was isotropic, unpolarized and constant in time. That was the full extent of their observational findings.

The first thing that needed to be done now – as any radio astronomer would do – was to estimate from this observation the absolute 4 GHz spectral intensity I_ν in the sky corresponding to this excess observed power [cf. Eq. (III-5)]:

$$\Delta P = C\, I_\nu\, \Delta\nu \int\int A_e(\theta, \varphi) \sin\theta \, d\theta \, d\varphi, \qquad \text{(IV-2)}$$

where $A_e(\theta, \varphi)$ is the effective collecting area of the antenna. The quantity C, we remember, is the factor that takes care of any mismatch between the antenna polarization and the polarization of the incoming wave. The φ (azimuth) integration is from 0 to 2π, and the θ (elevation) integration is from 0 (zenith) to $\pi/2$ (ground level), assuming that the mystery radiation is not coming from or through the ground. The antenna here is assumed to be lossless. The quantity $\Delta\nu$ is the bandwidth of the instrument, the band assumed to be square-shaped.

This estimated I_ν would be the reportable new result – a new discovery in the sky.

If now one wanted to *theorize* fancifully (without any evidence whatsoever) that this I_ν comes from a presumed blackbody spectrum in the sky of intensity $B_\nu(T_{bb})$ of temperature T_{bb}, then one logically needed to calculate T_{bb} from the equation

$$I_\nu = B_\nu(T_{bb}) \qquad \text{(IV-3)}$$

If it turned out now that this T_{bb} was close to the predicted Big Bang blackbody temperature T_{BB}, then one could *speculate* that Penzias and Wilson *may have* observed one point on the far trail of the relic radiation spectrum from the Big Bang. But this is not by any means a proof of existence of a blackbody spectrum in the sky.

The above calculation is the most straightforward and the only calculation that needed to be presented. Radio astronomy is after all about calculating intensities in the sky – first and foremost. However, the experimenters did not go anywhere near it – not then nor anytime afterwards.

Arno Penzias has been described as a radio astronomer by training, and Robert Wilson as an astronomer. So they were well familiar with standard calculations of the type above.

Was the above calculation possible to do? It is true that in the 1964-1965 time-frame computers were not as readily available. But for researchers at AT&T or Princeton it certainly was eminently possible, even if they had to process the old-fashioned punch cards. Other ways of calculating under reasonable simplifying assumption were also available.

Instead of reporting transparently that they observed an excess microwave power (a familiar physical quantity), Penzias and Wilson reported artfully that they observed an excess *Antenna Temperature* (a fictitious engineer's number.) This excess Antenna Temperature ΔT_A (~ 3.5 K) happened to be completely fortuitously in the same ballpark as T_{BB} which at the time was expected to be around a few degrees Kelvin.

Now the joint authors of the two papers reported the grand discovery of the Big Bang blackbody through this grand identification:

$$\Delta T_A \equiv T_{BB} \qquad \text{(IV-4)}$$

This is the story of the discovery.

IV-1.2 Language of Antenna Temperature

But let us by all means look at the problem in the language of Antenna Temperature in which the discovery has been posited. Let us stick to the very basics and keep an open mind.

First we reproduce the equation for Antenna Temperature [Equation (III-8)]:

$$P_{noise} = kT_A =$$

$$(1/4\ \pi)\ C \int_0^{2\pi} \int_0^{\pi} k\ T(\theta, \varphi)\ p(\theta, \varphi)\ \sin\theta\ \ d\theta\ d\varphi \qquad \text{(IV-5)}$$

The above expression can be simplified considerably if we assume that the antenna is floating freely in space, surrounded all around by an isotropic blackbody radiation field of uniform temperature T_{bb} extending to infinite distances. In that case

$$\Delta T_A \approx C\ T_{bb}. \qquad \text{(IV-6)}$$

Now, in their paper Penzias and Wilson say nothing about the polarization state of their antenna except that they found the mystery radiation unpolarized. If they found this using their Holmdel Horn antenna (and not an auxiliary antenna), then their antenna was linearly polarized. Generally speaking, the sugarscoop antenna would have a linearly polarized feed. If that is the case, then C = ½. So we now have

$$T_{bb} \approx 2\ \Delta T_A\ . \qquad \text{(IV-7)}$$

So, even under our most idealized assumption that favors the discoverers, an observation of an excess antenna temperature of 3.5K would indicate a blackbody radiation field of 7 K in the sky.

Note that in order for C to equal 1, the sky radiation would have to be collected through a dual-polarized feed and the powers in the two polarizations would then have to be added before determining the Antenna Temperature. At 4 GHz, this feed would probably be a substantial waveguide contraption, certainly not something one would forget to mention in a paper where this fact was of paramount importance. If Penzias and Wilson used such an elaborate feed structure, they surely would have said so in their paper. They would in any event have discussed the polarization factor C if they had considered it.

Now, Penzias and Wilson seem to suggest that the above idealized case (of the antenna being immersed in a uniform radiation field all around) is close to their case. Although the blackbody radiation is not entering their antenna from the lower hemisphere (ground), the antenna in any event is receiving very little radiation from that direction. So they suggest that for all practical purposes we can say that the blackbody radiation field surrounds the antenna all around.

If we accept that argument – i.e., if we bend over backward to accommodate the discovery – we reach the conclusion that Penzias and Wilson discovered a blackbody radiation field in the sky at ~ 7K.

As more reports of the measurement of the Big Bang blackbody followed that of Penzias and Wilson, the temperature of the Big Bang blackbody generally trended downward from their reported 3.5 K, eventually settling down at the value clinched by John Mather, T_{BB} = 2.735 ± 0.060 K. To encompass this number, the Penzias-Wilson result of ~7 K would have to have an error bar that would in itself negate the discovery.

Thus in no way, shape or form did Penzias and Wilson observe the 4 GHz point in the Big Bang blackbody spectrum. Their 1978 Physics Nobel Prize citation

… for their discovery of cosmic microwave background radiation

left over from the Big Bang had no basis in scientific fact at the time the award was made or any time before or after that.

The strange reluctance in the relevant scientific establishment – the radio astronomers in particular – in examining the experiment in any depth is a phenomenon that would repeat again and again with subsequent Big Bang experiments.

IV-1.3 Cosmic Microwave Background vs. Big Bang blackbody

There is no question that Penzias and Wilson were the first to observe what we now know as Cosmic Microwave Background radiation (CMB) – an all-pervasive, omnipresent, isotropic and largely unpolarized radiation field predominantly observed in the centimeter, millimeter and infrared wavelength region. The identification of this field as the blackbody radiation field predicted by Big Bang cosmology is where issues arise.

Is it possible to say, at least, that Penzias and Wilson made the first crude observation of the Big Bang blackbody? Based on what we know today – in the fall of 2014 – the answer is a most definitive and emphatic no.

It is significant that neither Penzias-Wilson nor John Mather (next chapter) reported the CMB intensity, but found that CMB is a blackbody. The WMAP and the Planck satellites measured the CMB intensity directly, and found that it was vastly different from a blackbody. Unfortunately for the world and for science this actual CMB spectrum has been kept a secret to this day.

Cosmic Microwave Background and Big Bang blackbody are two entirely unrelated and unconnected things. The first is an observed and established fact. The second is bad science that has been observationally disproved and discredited.

So cutting off of the bogus linkage between CMB and Big Bang blackbody closes the book on Big Bang.

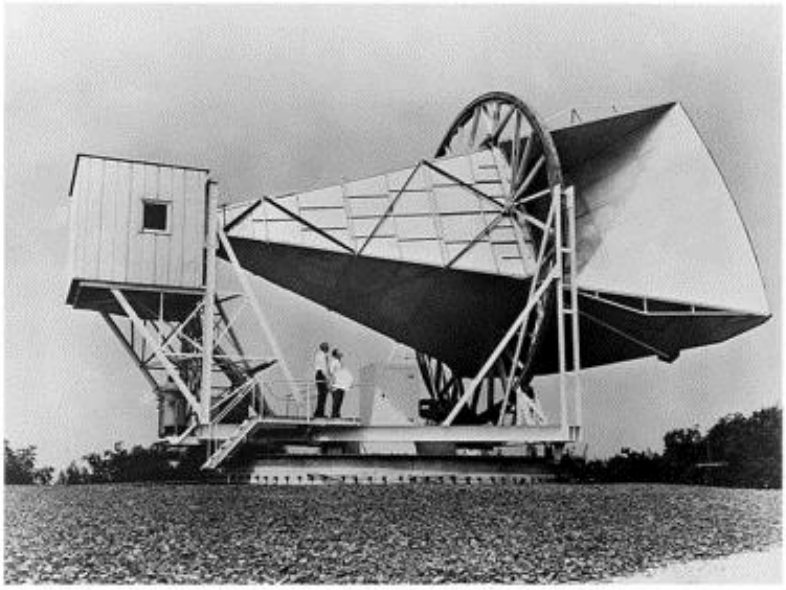
Finally, the astute Antenna & Microwave engineer who would have found the Penzias-Wilson blackbody most baffling at first sight would have been entirely vindicated in the last analysis.

A 2018 SEQUEL

(The following is a post from my blog site on October 8, 2018)

A QUESTION OF CIVILIZATION: What's in the shed?!

WHAT'S IN THE SHED?!



This is the famous Holmdel Horn Antenna, located in Holmdel, NJ, and belonging to AT&T. It is now a historical shrine to our scientific civilization. In 1964 it discovered the 3 K cosmic black body radiation in the sky, just as predicted by Big Bang Cosmology. For this clinching of Big Bang, the discoverers Arno Penzias and Robert Wilson were awarded the Nobel Prize in Physics in 1978.

Such photographs are ubiquitous today on the Internet. You can also see videos of the antenna majestically spinning about its horizontal axis and rotating about the vertical axis, thus pointing in different directions in the sky. But no scientific endorser of this discovery over more than five decades has ever asked: *What's in the shed?*

Bibhas De 10/08/2018

In 1964 one of mankind's greatest scientific feats occurred: the discovery of the predicted Big Bang Black Body relic radiation on the sky by two guys named Arno Penzias and Robert Wilson. This feat would be recognized in 1978 by the award of the Nobel Prize in Physics. And just recently, the Planck Scientific Collaboration has issued a resounding reaffirmation of this discovery. Next summer Robert Wilson will be celebrated at the Starmus V Festival in Switzerland.

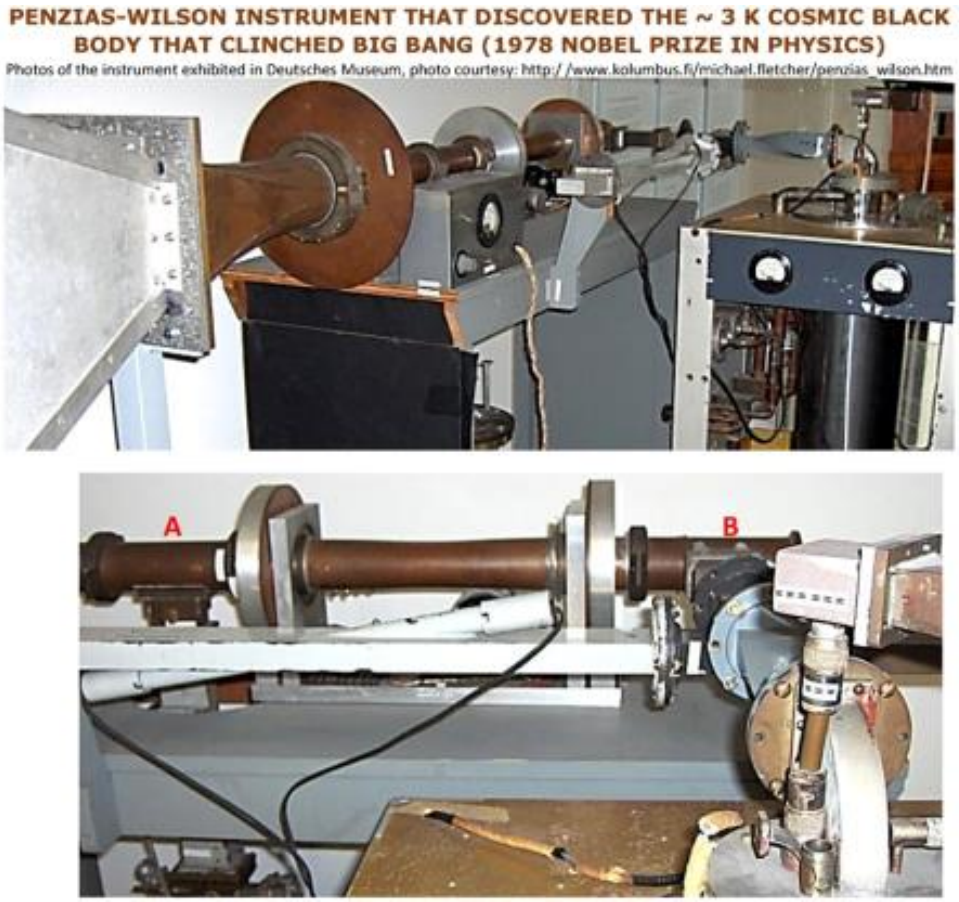
Fascinatingly, the discovery paper was very brief, like the Watson-Crick discovery paper.

However, if in the latter case brevity was the soul of wit, in the former case it was the heart of the scam.

When I read the PW paper for the first time with an investigator's mind-set, I was struck by the fact that there is absolutely no description of the instrument they used. I looked in the scientific literature, and I could not find anything there either.

Here was my problem. This was a satellite communication equipment and as such was most likely set up to receive two orthogonal linear polarizations. But the cosmic black body radiation is unpolarized. How can you receive the total power from this black body with this antenna? You have either to add the power in the two linear polarizations to get the full power on the sky, or use one polarization and account for a factor of 2. What did they do? This is the information I was looking for. In other words, I wanted to know what comes behind the Holmdel Antenna that has become a visual icon. What's in that shed? Not being able to find the answer, here's what I wrote in my 2015 book The Falsifiers of the Universe: *.. the powers in the two polarizations would then have to be added before determining the Antenna Temperature. At 4 GHz, this feed would probably be a substantial waveguide contraption, certainly not something one would forget to mention in a paper where this fact was of paramount importance.*

Sometime later I learned that there was an exhibit of the PW equipment in Deutsches Museum, and photos of this were available at this web site. So now we know what's in the shed. We can go back to my problem and resolve it.



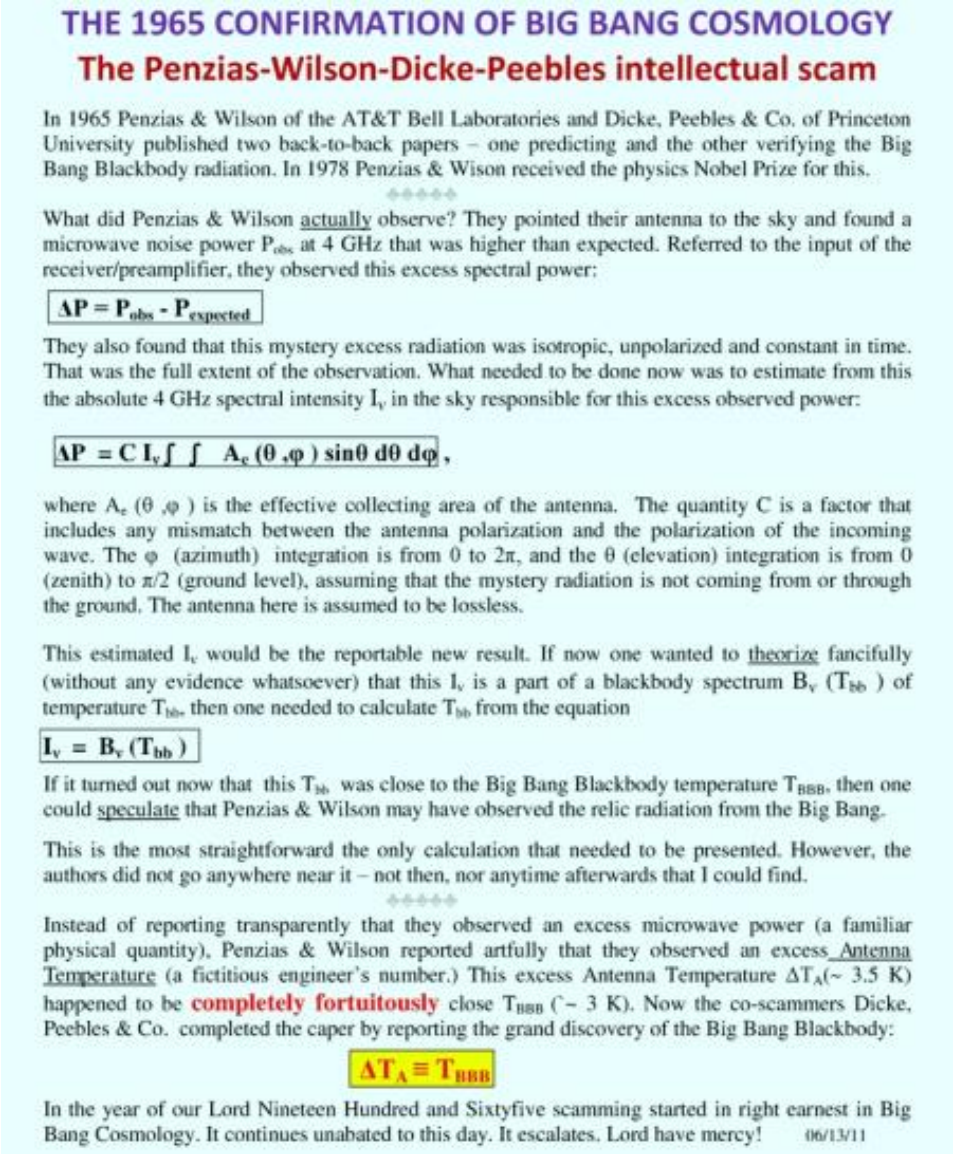
Refer to the figure. Radiation travels from left to right. The silver horn is a replica to represent the Holmdel antenna outside the shed. Everything else is inside the shed. This is the original equipment. The horn has a square cross-section. As unpolarized radiation from sky travels through this square pipe as two orthogonal linear polarizations, it is gradually transformed to a circular pipe so as to be able to accommodate a device called an Orthomode Transducer (OMT). This is the device marked A by me. At A, the OMT separates out the two orthogonal polarizations. Half the power travels downward at A through a standard rectangular waveguide that carries the polarization with the electric field vector perpendicular to the plane of the paper. This portion of the radiation is used for calibration purposes. Thus, half the unknown signal power to be measured is prevented from going into the receiver. The other half – where the field is vertical and in the plane of the paper – travels to the right and enters the receiver at the point marked B by me via a standard rectangular waveguide, seen coming out of the plane of the paper. This is the entire power Penzias and Wilson analyzed, and deduced from this a 3.5 K black body in the sky.

Michael Fletcher has also provided a block diagram of the instrument, endorsed by Arno Penzias.

So, half the power that was incident on the Holmdel antenna accounted for the entire discovery of a black body of 3.5 K – a temperature that happened to be just right to clinch Big Bang. Morale of the story: *Lose a factor of 2, get a Nobel.*

This is only one of the many fatal faults of this experiment. In no way, shape or form did Penzias and Wilson find any black body of any temperature on the sky. Nor did John Mather. Nor did Herbert Gush, nor anyone else for that matter

In this context I remind you also of these old graphics:



THE 1965 CONFIRMATION OF BIG BANG COSMOLOGY
The Penzias-Wilson-Dicke-Peebles intellectual scam

In 1965 Penzias & Wilson of the AT&T Bell Laboratories and Dicke, Peebles & Co. of Princeton University published two back-to-back papers – one predicting and the other verifying the Big Bang Blackbody radiation. In 1978 Penzias & Wison received the physics Nobel Prize for this.

What did Penzias & Wilson actually observe? They pointed their antenna to the sky and found a microwave noise power P_{obs} at 4 GHz that was higher than expected. Referred to the input of the receiver/preamplifier, they observed this excess spectral power:

$$\Delta P = P_{obs} - P_{expected}$$

They also found that this mystery excess radiation was isotropic, unpolarized and constant in time. That was the full extent of the observation. What needed to be done now was to estimate from this the absolute 4 GHz spectral intensity I_ν in the sky responsible for this excess observed power:

$$\Delta P = C\, I_\nu \int\int A_e(\theta,\varphi)\sin\theta\, d\theta\, d\varphi ,$$

where $A_e(\theta,\varphi)$ is the effective collecting area of the antenna. The quantity C is a factor that includes any mismatch between the antenna polarization and the polarization of the incoming wave. The φ (azimuth) integration is from 0 to 2π, and the θ (elevation) integration is from 0 (zenith) to $\pi/2$ (ground level), assuming that the mystery radiation is not coming from or through the ground. The antenna here is assumed to be lossless.

This estimated I_ν would be the reportable new result. If now one wanted to theorize fancifully (without any evidence whatsoever) that this I_ν is a part of a blackbody spectrum $B_\nu(T_{bb})$ of temperature T_{bb}, then one needed to calculate T_{bb} from the equation

$$I_\nu = B_\nu(T_{bb})$$

If it turned out now that this T_{bb} was close to the Big Bang Blackbody temperature T_{BBB}, then one could speculate that Penzias & Wilson may have observed the relic radiation from the Big Bang.

This is the most straightforward the only calculation that needed to be presented. However, the authors did not go anywhere near it – not then, nor anytime afterwards that I could find.

Instead of reporting transparently that they observed an excess microwave power (a familiar physical quantity), Penzias & Wilson reported artfully that they observed an excess Antenna Temperature (a fictitious engineer's number.) This excess Antenna Temperature ΔT_A(~ 3.5 K) happened to be **completely fortuitously** close T_{BBB} (~ 3 K). Now the co-scammers Dicke, Peebles & Co. completed the caper by reporting the grand discovery of the Big Bang Blackbody:

$$\Delta T_A \equiv T_{BBB}$$

In the year of our Lord Nineteen Hundred and Sixtyfive scamming started in right earnest in Big Bang Cosmology. It continues unabated to this day. It escalates. Lord have mercy! 06/13/11

Nobel Prize Lessons

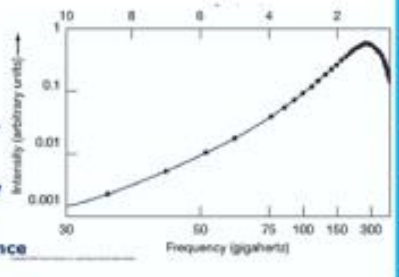
INSPIRATIONAL PROFILES OF CEREBRAL FRAUDS

THE EK-SELLENT SCAM THAT PLAYED WELL IN STOCKHOLM

PENZIAS WILSON DICKE PEEBLES

Greetings, young folks! We continue with our Nobel Lessons. Today you will learn that the scam that will not play in Peoria may just play well in Stockholm. Suppose you live in Hanford, WA (!). One day you go out to your backyard with a long spirit level and find that the yard is sloping slightly. From that singular observation, can you deduce the existence of the entire Mount Rainier? You can if you are Nobel material. For that is what Arno Penzias, Robert Wilson, Robert Dicke (ringleader), and Jim Peebles did. They were the team that discovered the Cosmic Microwave Background Radiation, and bogusly clinched Big Bang. Learn from the masters!

← **PENZIAS-WILSON in 1964 measured one data point at 4.3 GHZ (wavelength 70 mm), whose *Intensity* was not directly calculated to show that it falls on this curve. Instead, a false indirect argument was made to say that the single data point at the far reaches of the diagram proved the existence of this entire spectrum. Nobel Prize duly followed in 1978.**



COSMIC BLACKBODY SPECTRUM

Duty to Inform

A world education message from Bibhas De 03/03/2018

CHAPTER V-1

Penzias and Wilson

Arno Allan Penzias and Robert Woodrow Wilson were accidental discoverers. They never claimed to be anything else. And they truly were the discoverers of the Cosmic Microwave Background radiation.

But they were manipulated by Princeton's Robert Henry Dicke, Philip James Peebles and others into misinterpreting their data to serve the cause of Big Bang cosmology. They were posited as the discoverers of the Big Bang relic blackbody radiation. Penzias and Wilson should have known better than to allow themselves to be manipulated thusly. In this sense they are at fault.

They seemed genuinely surprised and humbled by the 1978 Nobel Prize. They both acted with dignity and reserve following their achieving the Nobel Laureate status. They do not seem to be in evidence pushing Big Bang cosmology.

Robert Dicke was an expert in antenna and microwave theory and techniques. He had in fact invented the radiometer known today by his name. He had long done experiments in this area. He worked with experimental groups in this area at the MIT RadLab. He and his experimental colleagues at Princeton had to know that they were force-fitting the Penzias-Wilson observation into the Big Bang theory. They probably felt that somehow getting this Big Bang confirmation into print in a peer-reviewed journal would legitimize it and place it beyond question. It did. The role of *Astrophysical Journal* in publishing the twin-papers is to be noted here – as also with other bogus Big Bang discoveries. With the discovery thus cordoned off within the perimeter of astrophysics, there was never any occasion for any appropriate engineering experts to come to scrutinize it. Which industry engineer has the reason and the time and the inclination to go digging into cosmological discoveries consummated by high academics? The discovery was saved harmless from the prying eyes of true experts.

There was talk in the scientific circle of Dicke getting a share of the Nobel Prize. After all, three people can share the Physics Nobel Prize in any given year. But for some reason that did not happen.

At the time of closing this book, Arno Penzias seemed to be in quiet, well-earned retirement. Robert Wilson held a position at the Harvard Smithsonian Center for Astrophysics and was very much in evidence in the Big Bang scene. He participated in scientific meetings, and spoke of his discovery. He gave interviews. He was very visible at the Press Conference where the BICEP2 discovery was announced on 17 March 2014. However, in all these it seemed that he was generally enjoying himself and not pushing or selling anything.

History might adopt a revised view that Penzias and Wilson are discoverers of CMB – an important observational discovery. In this way the two men may be held blameless as to Big Bang while at the same time given a continued place in the pantheon of the discoverers. Whether or not these scientists want to make public statements disowning Big Bang is of course their choice. It is after all their history and their legacy.